FAFNIR BEARING PLANT HAER No. CT-159
Bound on North side by Myrtle Street,
on the South side by Orange Street, on the
East side by Booth Street and on the West
side by Grove Street
New Britain
Hartford County
Connecticut

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORDS
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

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HISTORIC AMERICAN ENGINEERING RECORD

FAFNIR BEARING PLANT

HAER No. CT-159

Location:

Bound on North side by Myrtle Street, on the South side by Orange Street, on the East side by Booth Street, on the West side by Grove Street
New Britain, Hartford County, Connecticut

UTM: 18. 4615370 N . 683910 E
Quad: New Britain, CT, 1:24,000

Dates of Construction:

Earliest building, 1880; additions and new buildings, 1903, 1907, 1908, 1909, 1915, 1918, 1925, 1929, 1935, 1940, 1941, 1942, 1947, 1948, 1951, 1966

Engineer:
Unknown

Architects:
Unknown

Present Owner:

Torrington Company, Division of Ingersall Rand, New Britain, CT

Present Use:

Vacant

Significance:

Fafnir Bearing Company was one of a half-dozen ball bearing manufactures that dominated world production of ball bearings in the first half of the twentieth century. Fafnir made several important contributions to ball bearing manufacture including patents for wide inner ring bearings, self-aligning pillow blocks, and self-locking cam collars.

Project Information:

Torrington Company vacated the site in December 1988. Since that time numerous attempts have been made to market the property for reuse with no success. The complex will be demolished to make way for new construction in New Britain's Urban Enterprise Zone.

Dan Mayer
Dan Mayer Associates
133 Griswold Road
Wethersfield, CT 06109

Historic Development

Fafnir Bearing Company is one of a half-dozen Connecticut ball bearing manufacturers that dominated world production of ball bearings in the first half of the twentieth century. The other manufacturers beside Fafnir were New Departure, the Torrington Company, Marlin-Rockwell corporation and Norman Hoffman Corporation. Bearings made by Fafnir were significant in the development of the aerospace, agriculture, automotive, and precision machine industries. The modern bearings made by Fafnir satisfied the need for greater strength, greater speeds, higher precision, and increased reliability that the moving shafts, fan blades, propellers, rotors, axles and moving parts that the automobiles, airplanes, rockets, tractors and motors demanded.

The Fafnir bearing Company was founded in 1909 by Howard S. Hart. Hart's inspiration for the venture came during the ultimately unsuccessful attempt by American Hardware to produce and market the Corbin automobile between 1908 and 1912. The trouble and expense of obtaining ball bearings from Germany and England led Heart to form the Fafnir Bearing company, named after a sorcerer's dragon in Wagner's opera, Siegfried. The Fafnir bearing company began at the Booth Street site when it was given in 1909 a small amount of space in the Hart and Cooley complex that manufactured warm air registers.

At first the ball bearing business consisted primarily of research, marketing German bearings and importing steel from Europe. In 1913 Fafnir obtained a license under the Conrad patents that form the basis for modern ball bearing manufacture, to manufacture their own bearings; however, World War I interrupted the flow of German-made bearings greatly increasing the demand for domestic bearings. Most of the bearings made during this time were made for Ford and Dodge. The bearing business expanded rapidly. Production space was added to Building #1 in 1911 and 1914. The brick masonry buildings along Orange Street, Buildings #18 and #19, were completed in 1918 and 1919. They were the last of the principal brick masonry buildings built on the site. In 1919 Hart and Cooley moved completely out of the Booth Street plant and the two became separate companies.

During the 1920's Fafnir made several important contributions to ball bearing manufacture. It developed and patented the wide inner ring ball bearing which was applied to hanger boxes for industrial line shafting. Fafnir developed self-aligning pillow blocks in 1924 which made plant change overs of the power transmission drives less time consuming and cheape, which secured Fafnir's lead in industrial bearings. A third important development was tin the patenting of the self locking cam collar in 1925.

The Booth Street plant continued to expand with a six-story reinforced concrete building added in 1925 and a second ell of similar construction added in 1929. These and the other major manufacturing structures, Building #28 , Building #28a, and Building #28b were all reinforced concrete factories using C.A.P. Turners flat slab method of construction.

Continuous product development brought forth a drive in the 1930's that established Fafnir as a leader in aircraft control bearings. The rod and hinge bearings that are found in the linkage systems of aircraft that operate control surfaces, and the wing flaps went from six in the Ford Tri-Motor of the 1920's to 250 in the DC-3 of the 1930's to 1599 in the Boeing 707 of the 1950's. By the end of 1934, Fafnir served all airplane manufacturers. For the aircraft industry Fafnir patented new and improved bearing seals (1937, 1939, and 1943), light duty pillow blocks, flange units (1936), pressed steel pillow blocks, and rubber pillow blocks 1936). In support of the war effort, Fafnir began 168 hour work weeks with three daily shifts turning out 60% of their production capacity for aircraft applications.

With the completion of the last major manufacturing building at the Booth Street site, further expansion of the Fafnir Bearing Company was directed to other locations in New Britain, a large facility in Newington, Connecticut, two southern plants, and foreign acquisitions. At the Booth Street plant further development of the site after World War II and into the 1970's centered around refining the building systems for handling cleaning solvents, for filtering air and maintaining constant temperatures. They also added the necessary testing facilities and special manufacturing areas

needed for precision manufacturing work required of the jet aircraft, aerospace and precision tool industries.

The least precise manufacturing operations were done on the lower level with increasing degrees of precision and cleanliness required as the manufacturing process moved upward. In Building #28 for example, heat treating, plating and storage were done on the first floor. On the third level was grinding for medium bearings; finish grinding on the fourth level, noise and test rooms on the fifth level, and final grinding for super precision bearings on the sixth level. In Buildings #27 and #29, likewise, precision and super precision bearings were on levels five and six. On level five of Building #27 was 4000 sq. ft. clean room whose sole purpose was to assemble, clean, and inspect instrument ball bearings in a completely dust free environment. In the room , bare paper and pencils were prohibited and workers were required to wear dust proof smocks and hats. The workers entered the space across a sticky mat which removed dust from shoes and under a 30 mph air shower which blew away any dust. Chrome was used for furniture. Walls, partitions and work benches were made of glossy plastics and plate glass. The bearings manufactured here were used for instrument, aerospace, and national defense applications.

Description

The Fafnir Bearing complex is on a 13.7 acres site with 29 separately erected buildings totaling 598,755 square feet. Twenty-five of these buildings are joined one to another. The complex was built between the 1880s and the 1970s with the most significant construction occurring between 1915 and 1951. There are six primary manufacturing buildings. Those built before 1920 are three-to six-story, brick masonry, buildings with low pitched roofs and segmental arches over the windows; the interiors are constructed according to the slow burn construction standards of the time. The buildings built after 1920 are six-story, reinforced concrete ones with metal sash windows and brick between the concrete posts. The complex is dominated by the 481' x 60' reinforced concrete structure and two 60' x 180' and 60' x 240' reinforced concrete ells running a right angles to the larger building. The reinforced concrete buildings, combined with the primary brick masonry buildings, enclose a courtyard which has

the support buildings for the factory--the hospital, classrooms, storage sheds, boiler house, forge shed, and buildings for cleaning solvent.

Initially the site began as a foundry located where Buildings #2, #3, and #6 stand. This was, as documented by the Sanborn Insurance maps, a two-story building on Booth Street connected to a one-story foundry building sited perpendicular to Booth Street. The foundations under the Buildings #3 and #6 were probably part of the foundry shed. The first two floors of Building #2 were also part of the foundry. This two-story, gable roof structure was heavily altered in 1942 by adding three floors, modern metal sash, and a flat roof.

When Hart and Cooley built their manufacturing buildings on this site, they began by building along Booth Street, now Building #1, adding Building #4 (boiler house), Building # 5, and erecting two stories on the foundations of the foundry to make Buildings #3 and #6. All of these were two and three-story brick masonry buildings. The windows had segmental arched lintels and the roofs were low pitched with the exception of Building #3 that has a monitor roof. Inside wooden columns supported floors designed according to "slow burn" construction practices.

Buildings #1-6, the pre-Fafnir structures, were modified with the growth of the company. Additions to building #1 were made in 1911 and 1914. Each time the addition nearly matched the original construction. Building #4, a one-story brick boiler house, doubled in size in 1945 with the addition of two more boilers. The last large masonry factories, buildings #18 and #19 were built along Orange Street. Building #18 was a three-story masonry 241' x 51' structure and Building #19 was a six-story 232' x 51' structure. Construction continued along Orange Street with the erection of Buildings #27 (1925) and #29 (1929), but the primary axes of these buildings were north and south, perpendicular to Orange Street. The last major building (#28) was again perpendicular to Buildings #27 and #29 and forming a "C" plan of the major manufacturing buildings. Building #28, built in 1929, had nearly two identical additions (Buildings #28a and #28b) built in 1941 and 1951 respectively. These buildings were built in line with Building #28 giving the appearance of one 481'

long building. Although set in the middle of the block, building #28, #28a, #28b dominates the view along Myrtle Street and from the center of the city.

The major manufacturing buildings enclose a courtyard that contains one- and two-story buildings. The most prominent of these is a one- and one-half story steel framed forge and annealing shed (Building 12). It has a clerestory roof with stacks that dominate the skyline. Other buildings include one- story hospital/union offices (Building #42), two-story classroom /storage building (#44 and #16), a dust collection building, a storage building, and a one and one-half story building for reclaiming and processing solvent and oil (Building#45).

All of the manufacturing equipment and office furniture has been removed. Equipment left was the air-conditioning equipment and pumps for the oils and solvent of the manufacturing process. Since the building has been unused for eight years, electrical equipment, heating registers, and air conditioners have been vandalized. The glass partitions in the clean rooms and inspection areas have been broken and many of the plastic panels in the drop ceilings have been removed or broken. Major roof leaks have occurred in Building #1 and groundwater has flowed into Building #29.

Sources of Information/Bibliography

A. Engineering Drawings

Two drawings found: a floor plan and elevations (north view) of the Booth Street complex . Both drawings were done in 1968 by J. Mosely and represent the site as it was documented in 1995. The drawings are archived at the New Britain Public Library. (Site plans page 25 and elevations page 28.)

B. Historic Views

A number of historic photographs of the Fafnir Bearing Plant are located at the New Britain public Library; the dates of these photographs are unknown. The following archives were also researched for historic photographs: Hartford Public Library, Connecticut State Library, Connecticut State Museum, Connecticut Historical Society, Torrington Company Archives, and the New Britain Industrial Museum. The New Britain Industrial Museum does have artifacts and video copies of two short films produced in the early 1960s about the Fafnir Bearing Company.

C. Bibliography

Booth Street Enterprise Zone, Municipal Action Council, New Britain, CT, (sales pamphlet): n.d.

Cooper, Elisha H. "Fafnir: A Personal Record of Its Beginning and Early Years," *Fafnir News*, (May-November): 1947.

Cooper, Stanley M. Fafnir's First Fify Years, Fafnir Bearing Company, (pamphlet): n.d.

Cooper, Stanley M. Fifty Years of Fafnir, Fafnir Bearing Company, New Britain, CT, 1969.

The Fafnir Story, Fafnir Bearing Company, (pamphlet): n.d.

Gordon, Wayne. "T", Ingersall Rand, (Ingersall Rand research paper): n.d.

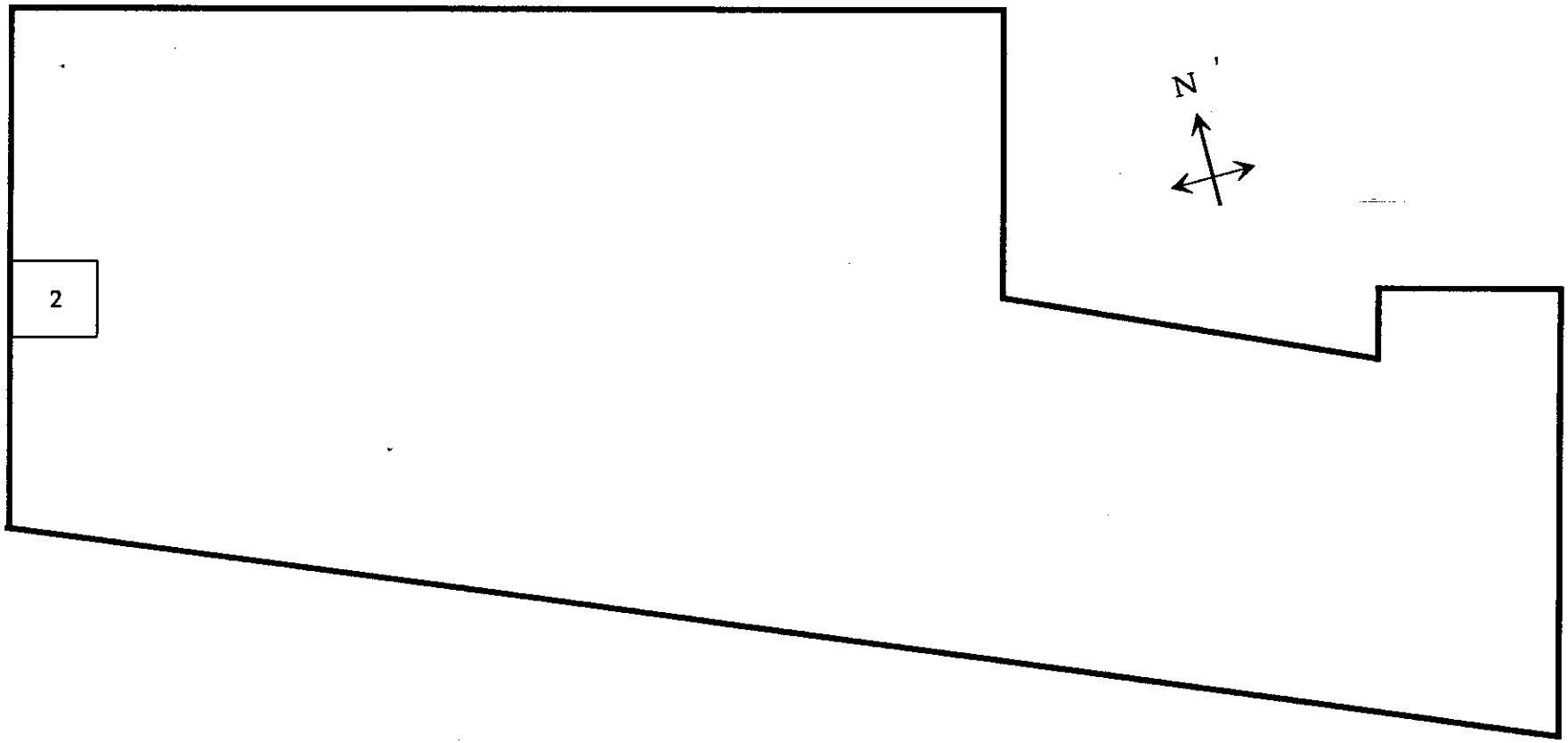
Lieberthal, Edwin, M. Progress Through Precision, Torrington Company, 1972.

Roth, Matthew. Connecticut: An Inventory of Historic Engineering Industrial Sites, Society for Industrial Archeology, Washington D.C., 1981.

Sanborn Map Company. Fire Insurance Maps, New Britain, Hartford County, Connecticut, 1895, 1901, 1909, 1928, 1954.

Graphic Documentation

The following documents the chronological development of the Booth Street Fafnir Bearing complex. Dates are given for the construction of each of the 29 buildings on the site. A current site plan, measured floor plan, and elevation follow.



FAFNIR SITE PLAN - 1880

New Building: 2

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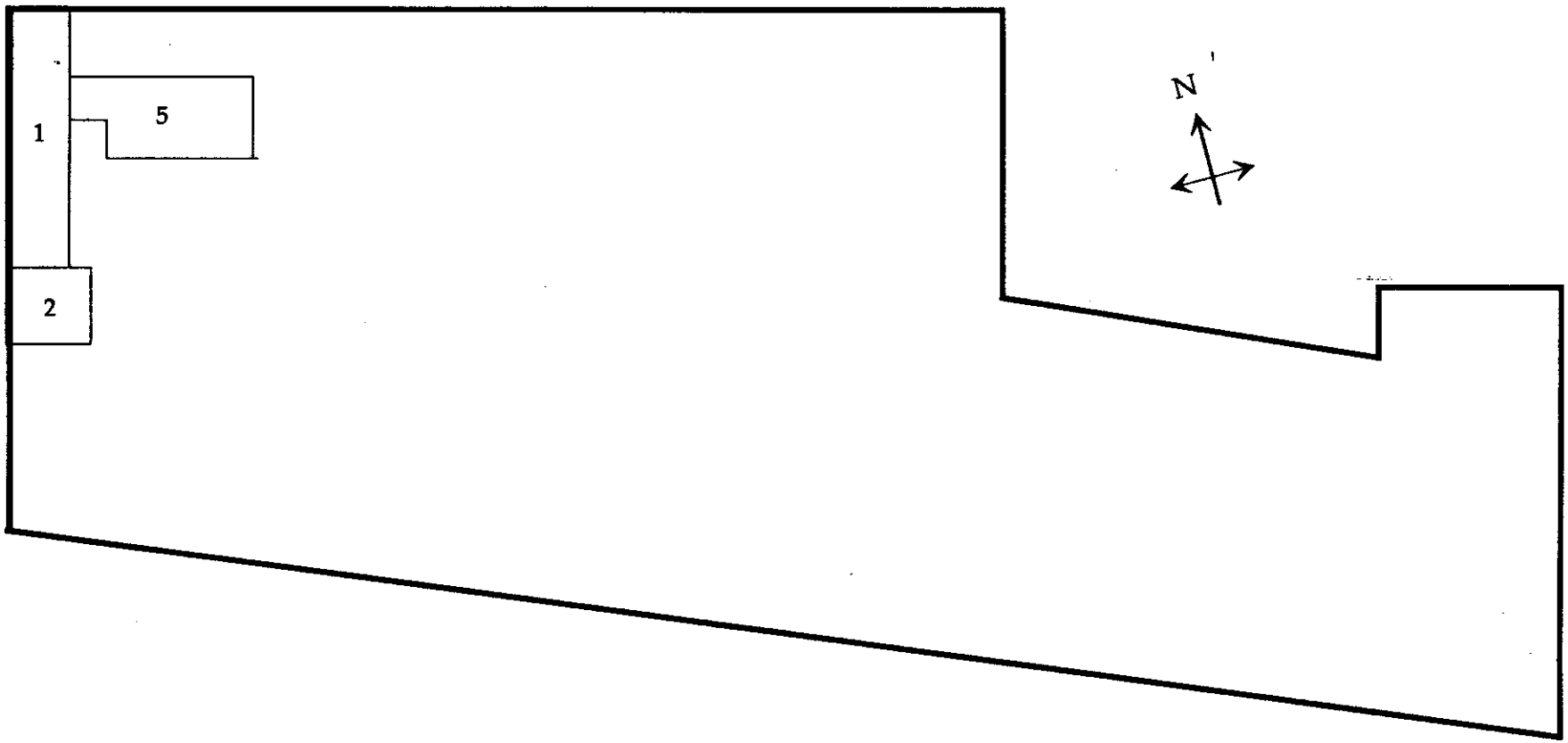
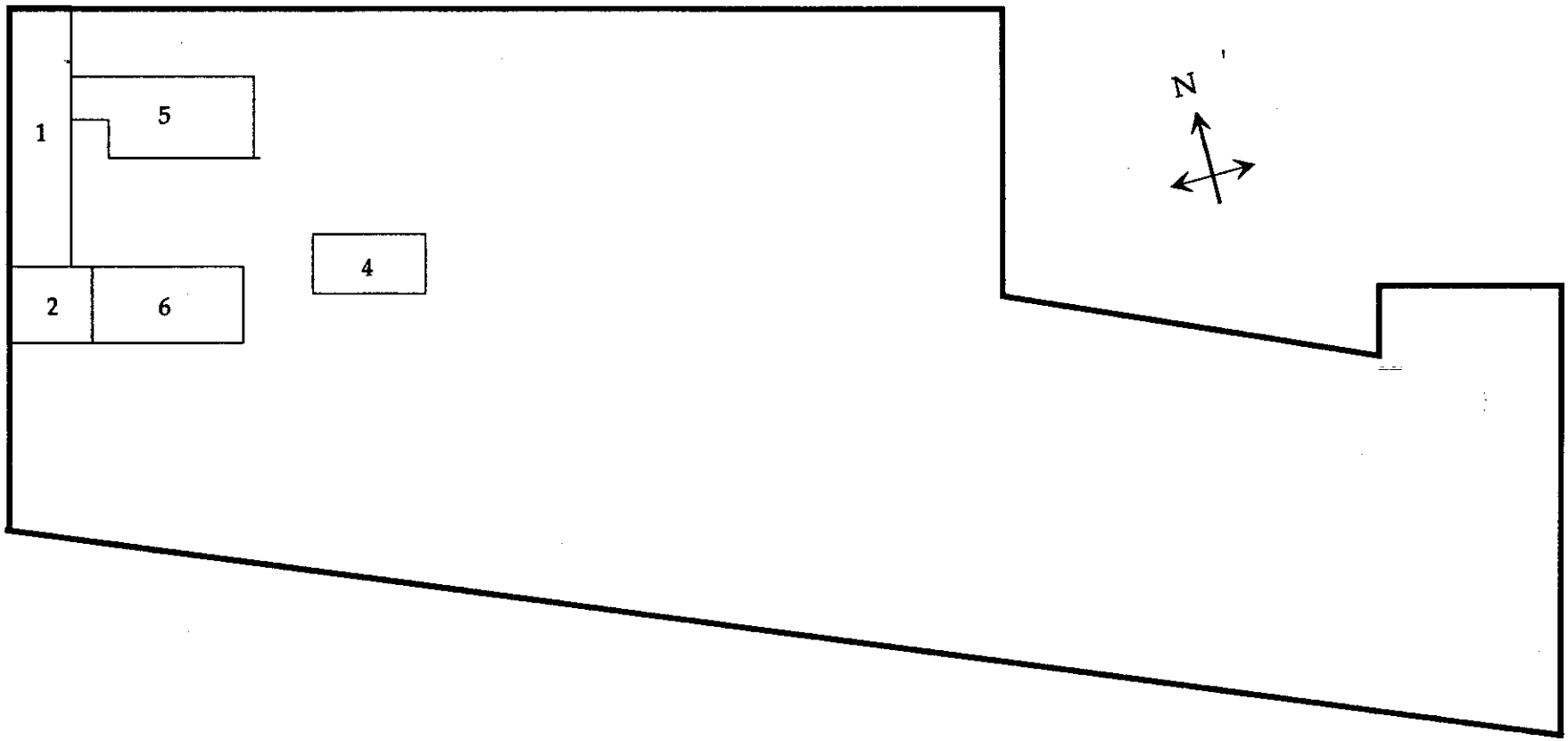


FAFNIR SITE PLAN - 1903

New Buildings: 1 & 5



FAFNIR SITE PLAN - 1907

New Buildings: 4 & 6

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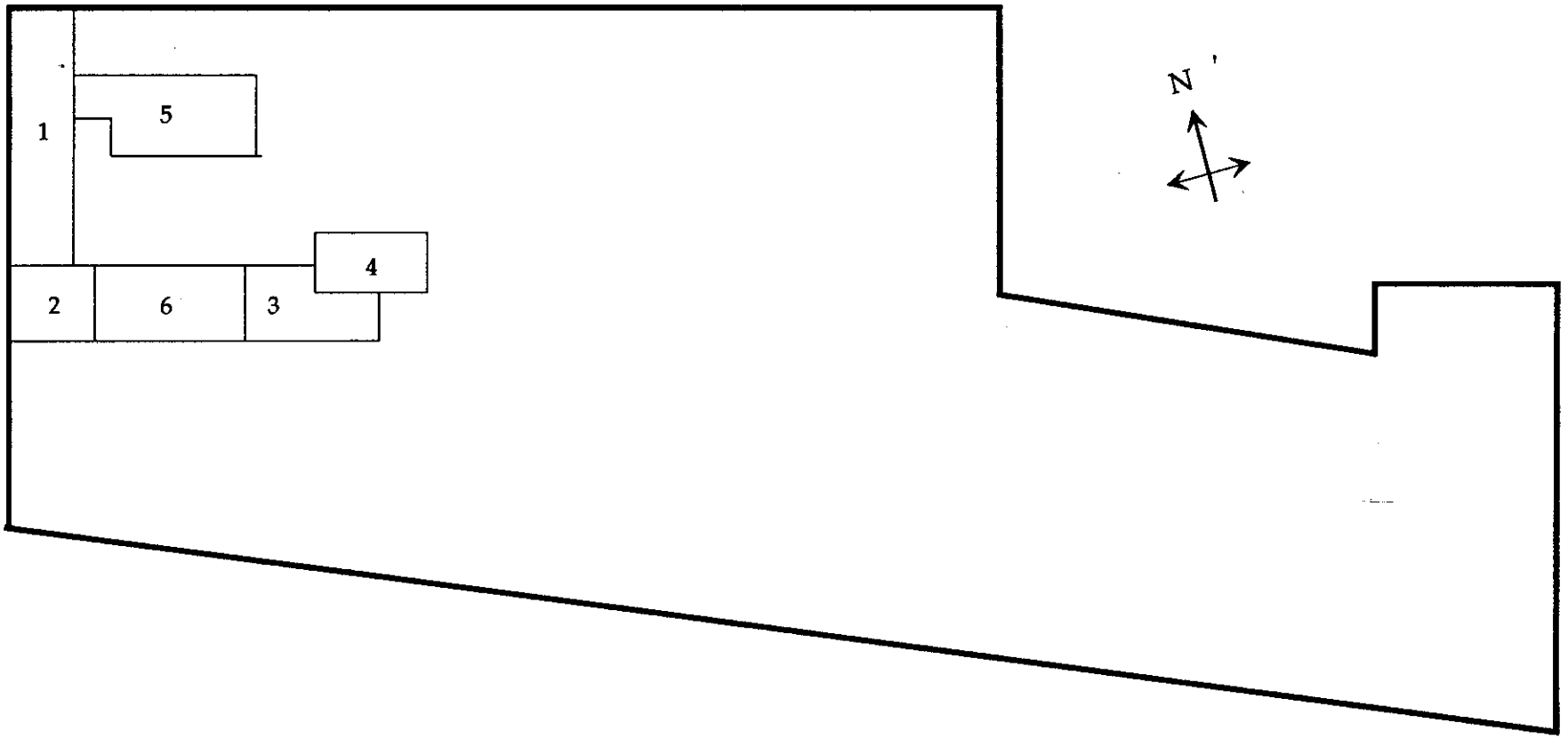
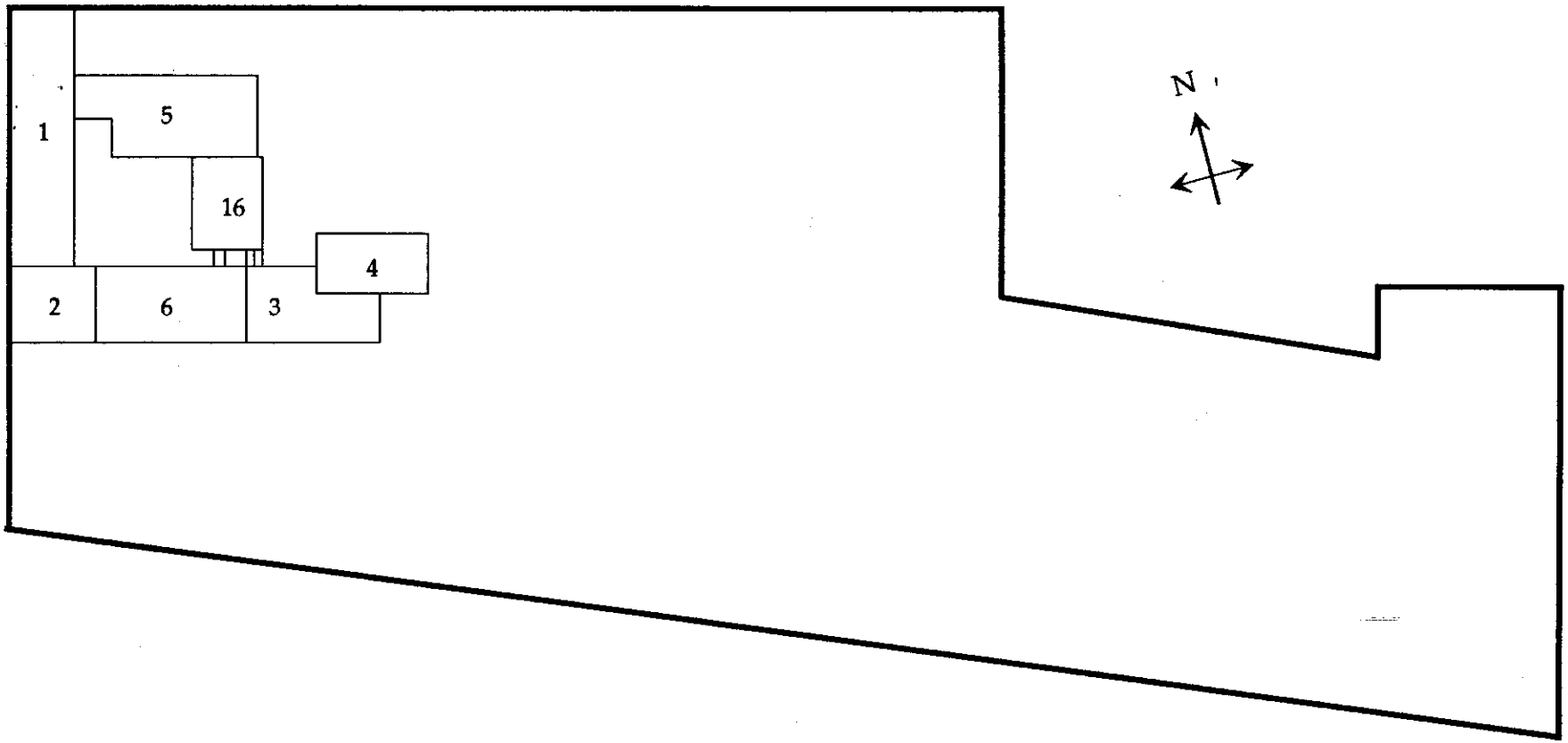


FAFNIR SITE PLAN - 1908

New Building: 3



FAFNIR SITE PLAN - 1909

New Building: 16

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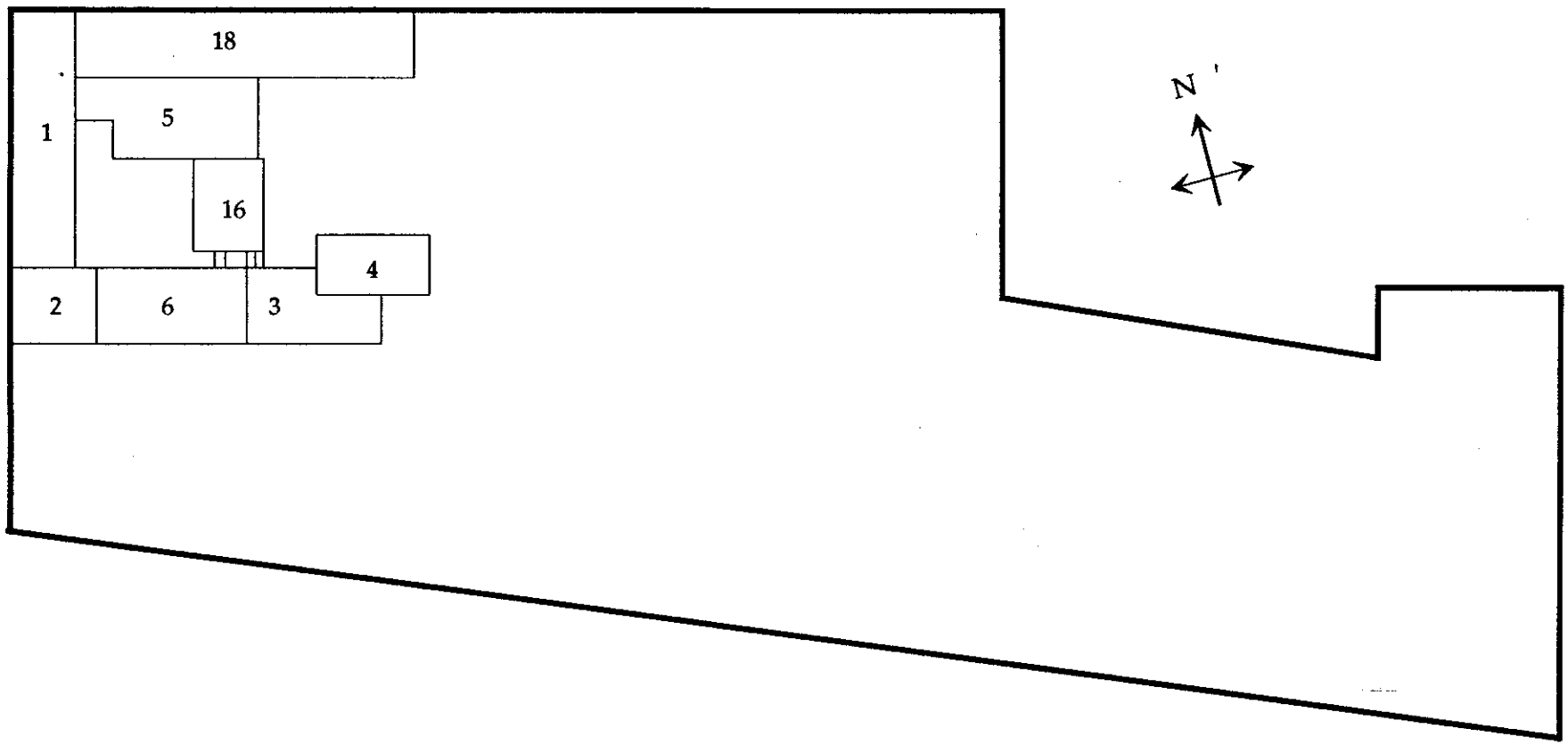

FAFNIR SITE PLAN - 1915

New Buildings: 18

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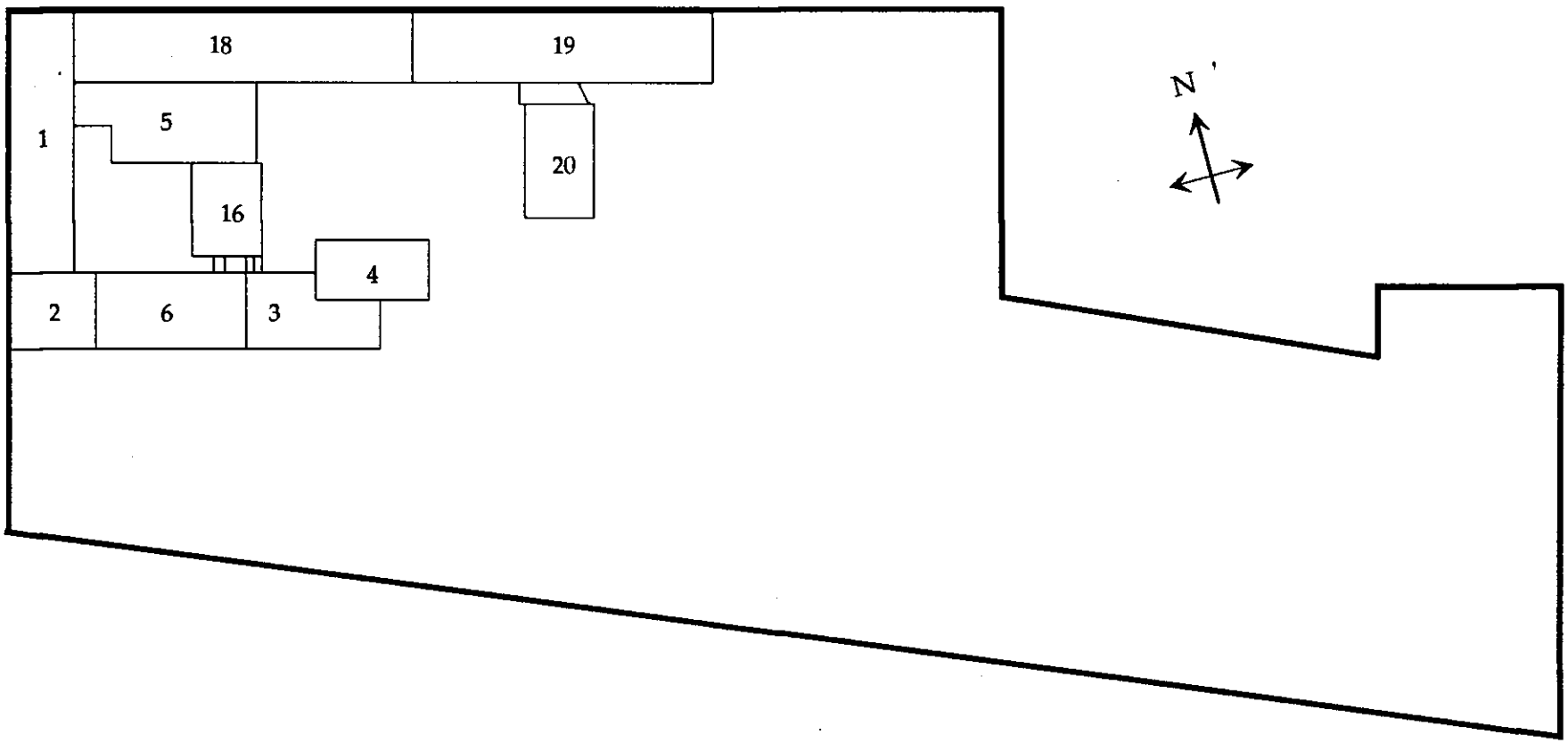

FAFNIR SITE PLAN - 1918

New Buildings: 19 & 20

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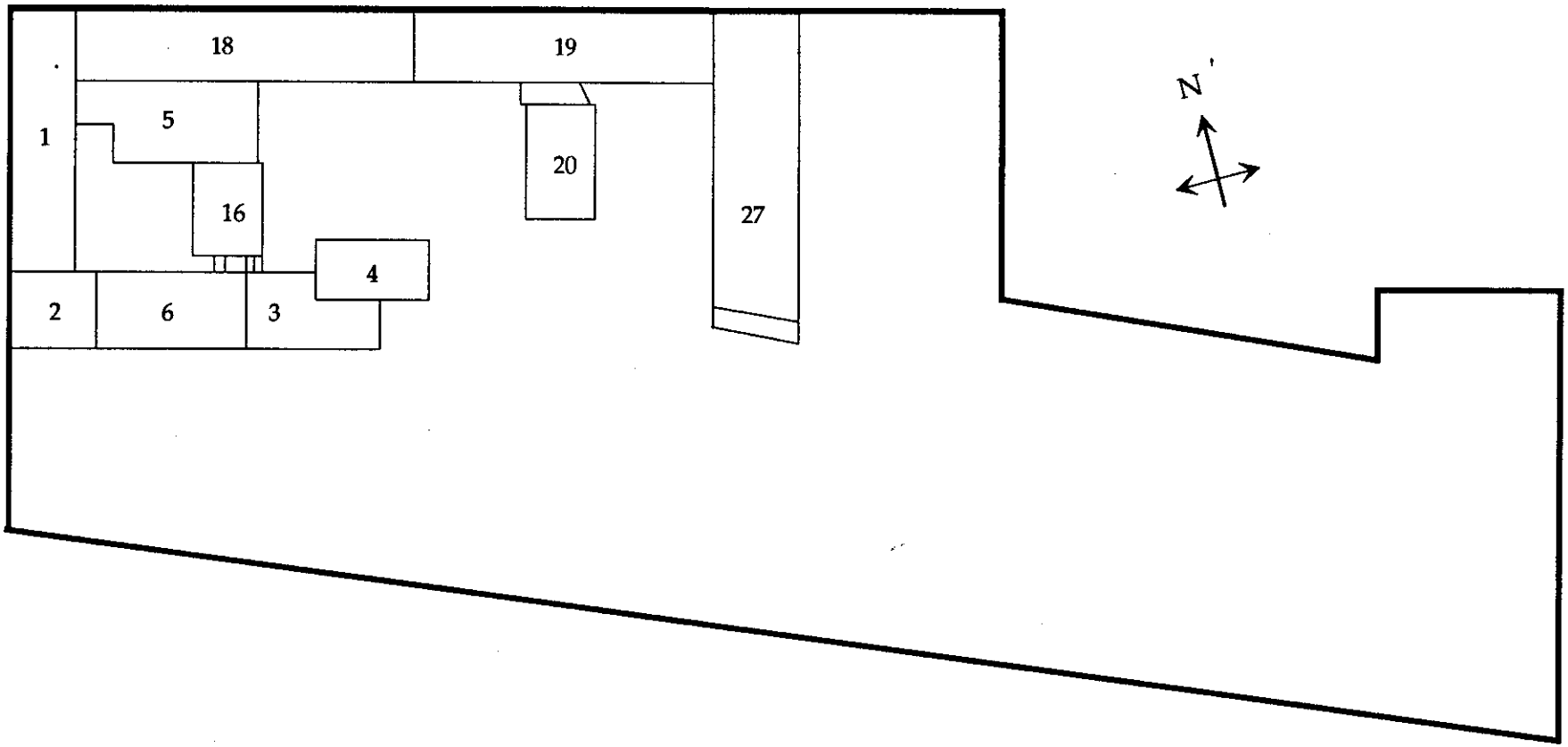
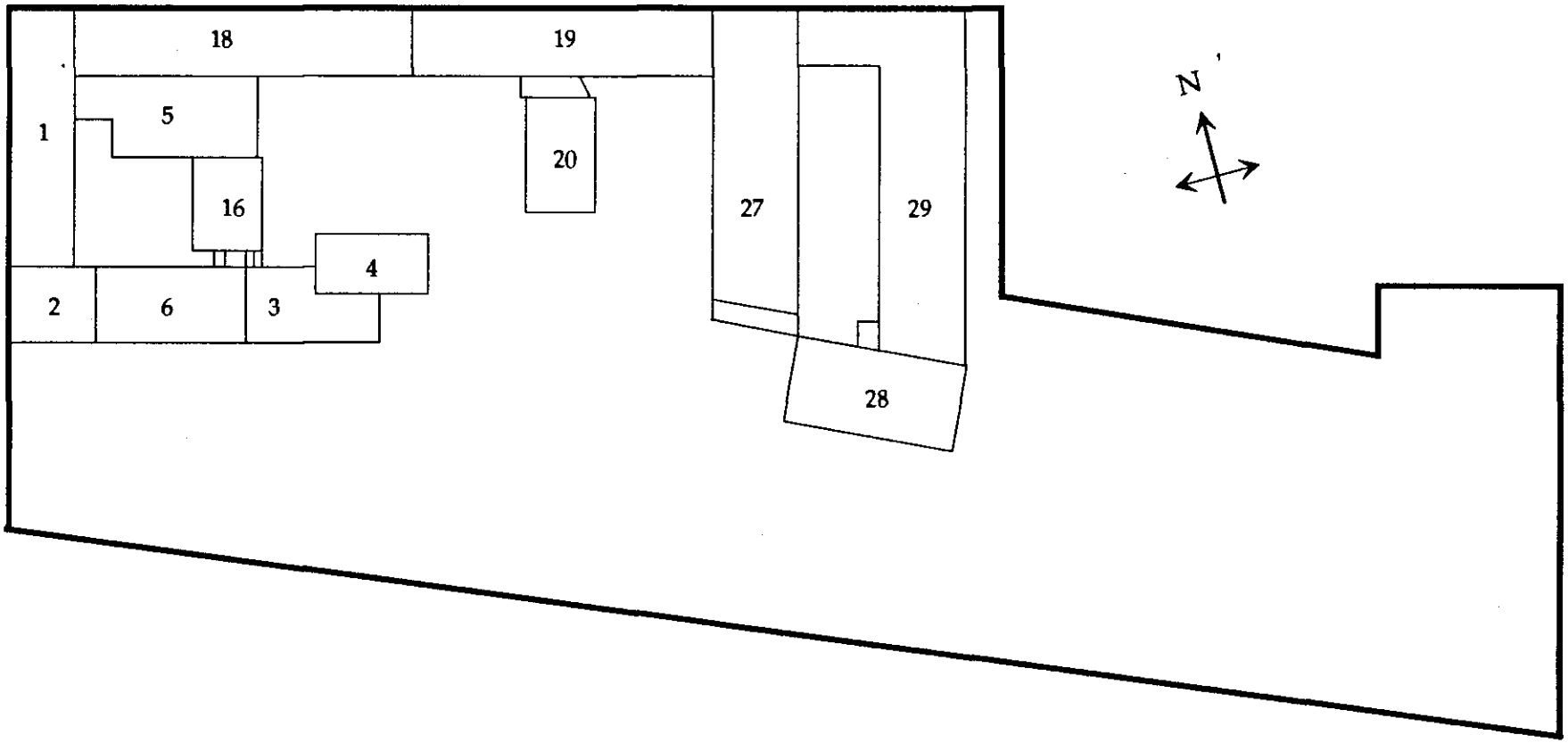


FAFNIR SITE PLAN - 1925

New Building: 27



FAFNIR SITE PLAN - 1929

New Buildings: 29 & 28

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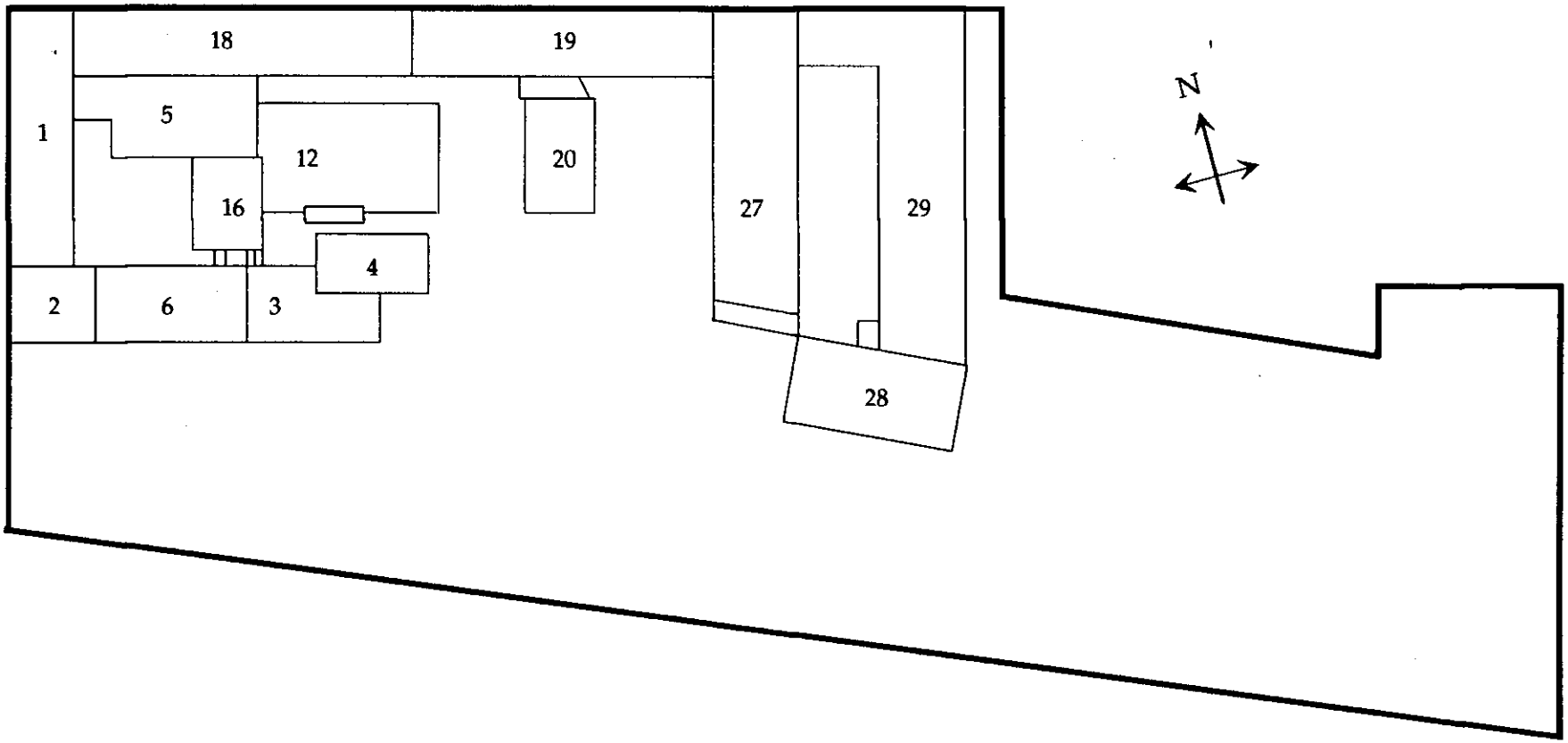

FAFNIR SITE PLAN - 1935

New Building: 12

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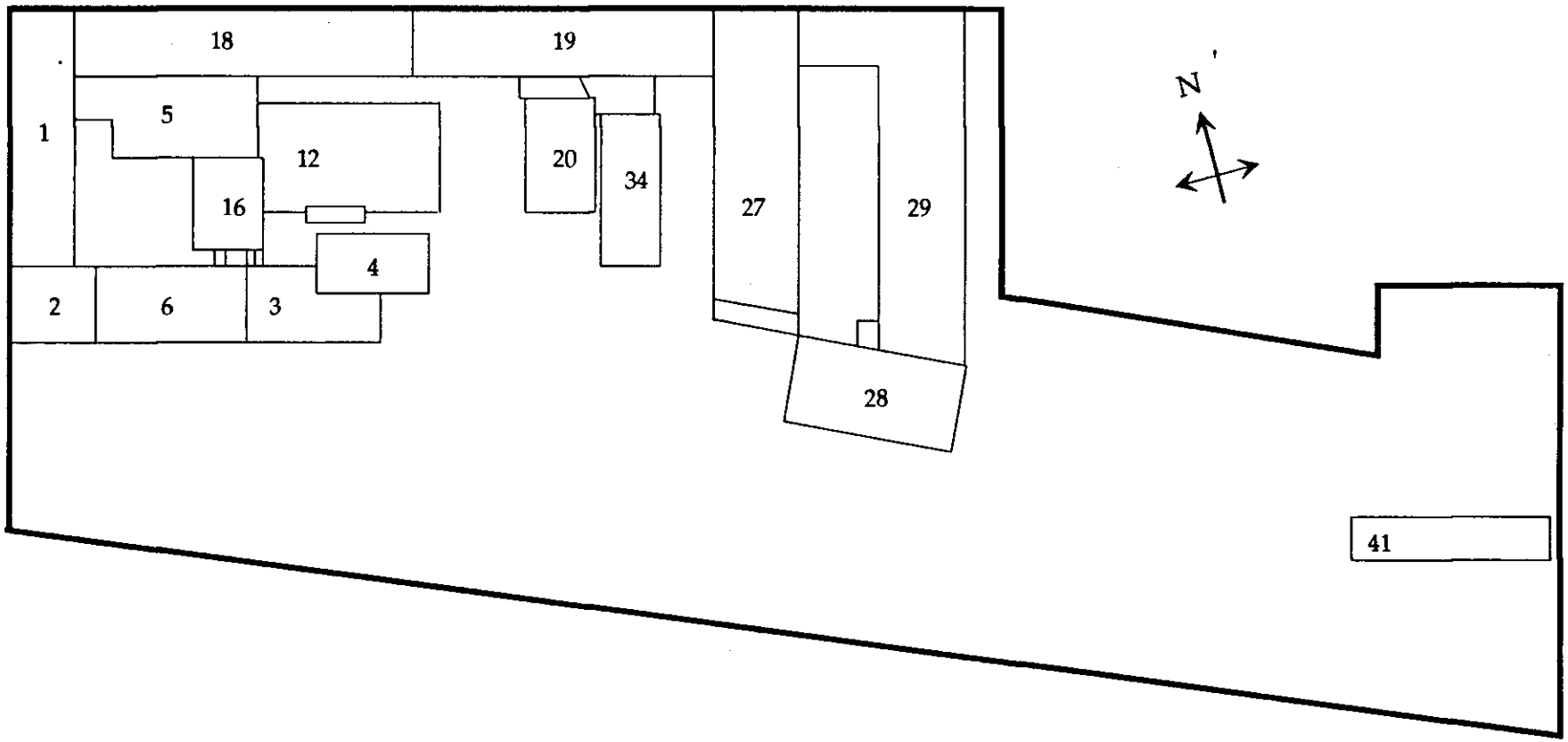

FAFNIR SITE PLAN - 1940

New Buildings: 34 & 41

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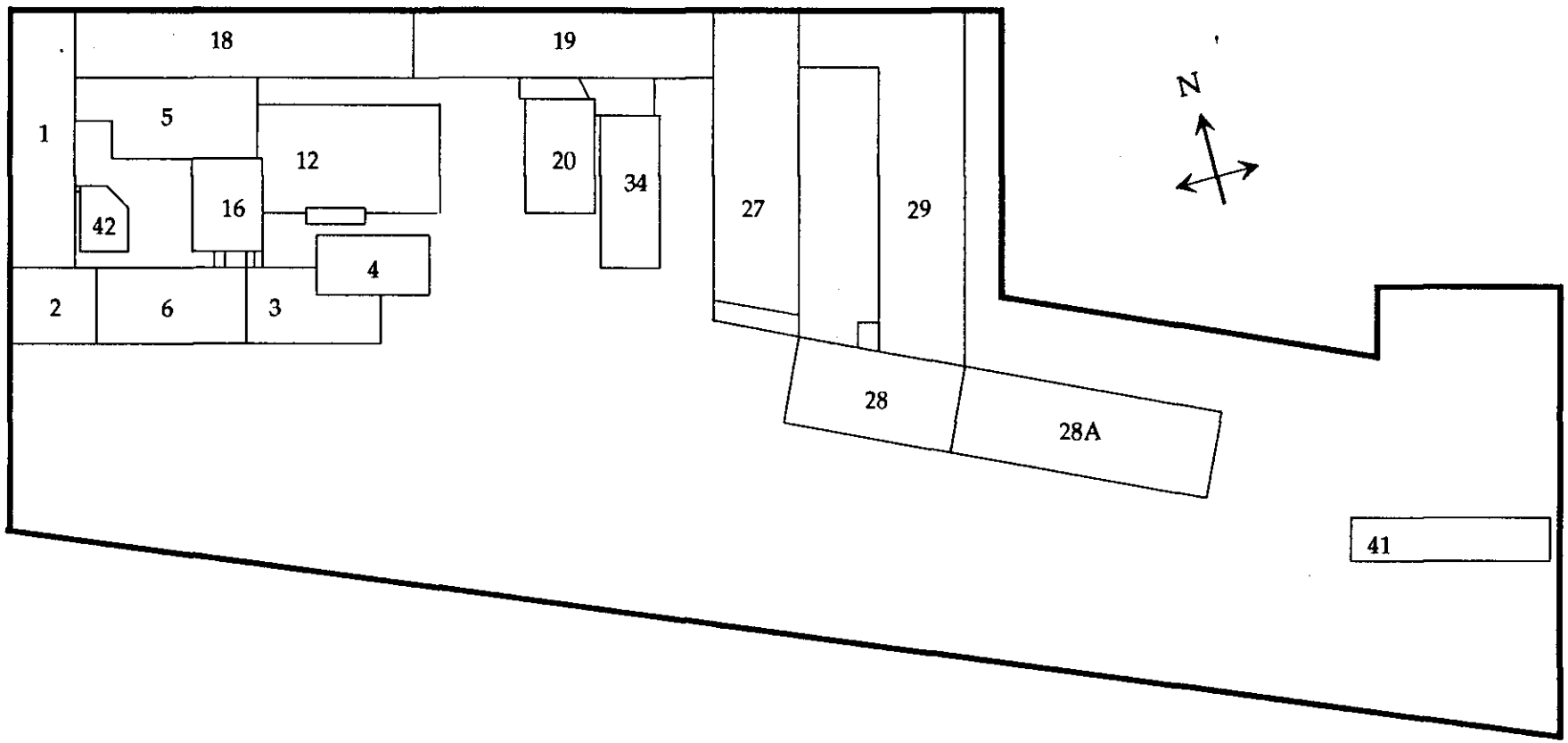

FAFNIR SITE PLAN - 1941

New Buildings: 28A & 42

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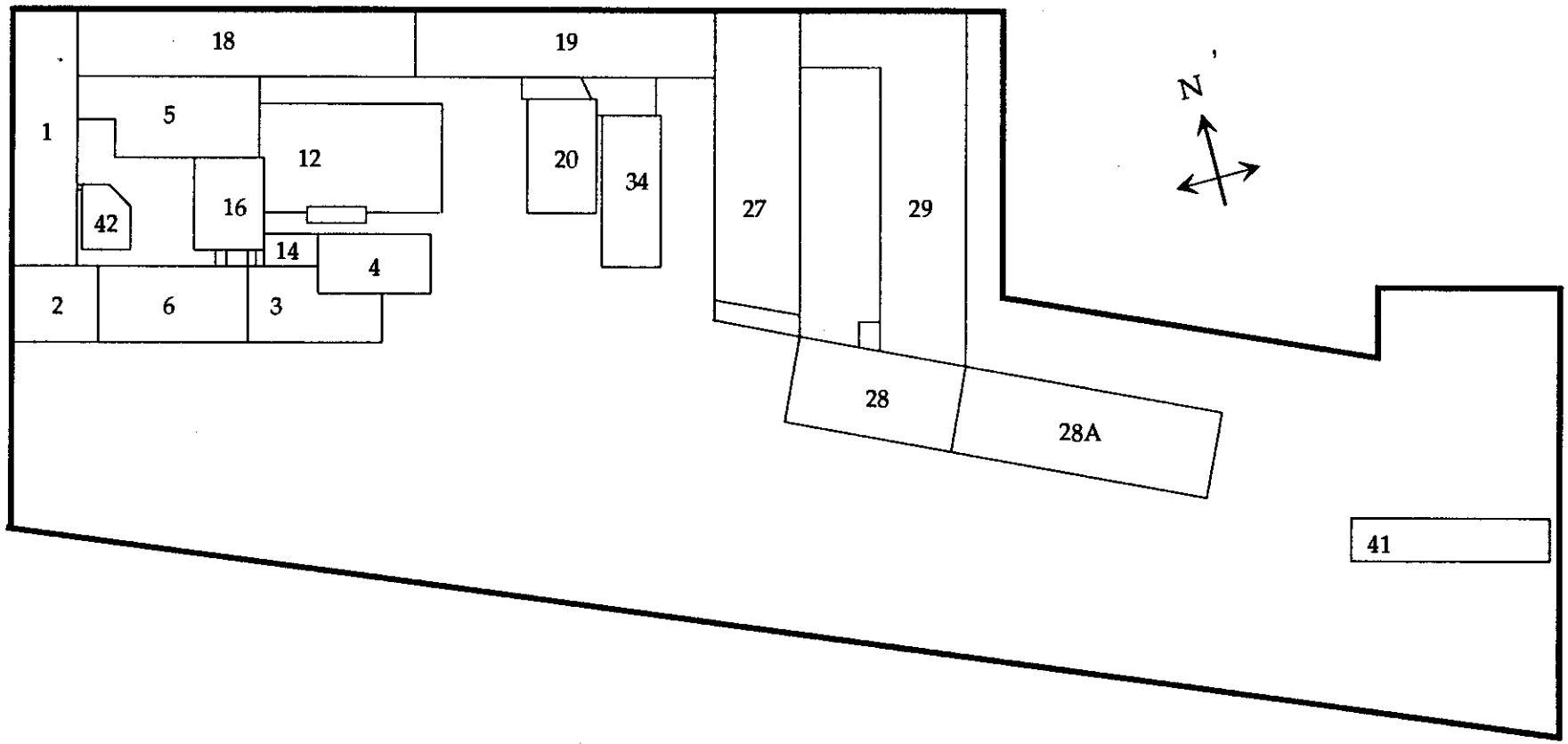

FAFNIR SITE PLAN - 1942

New Building: 14

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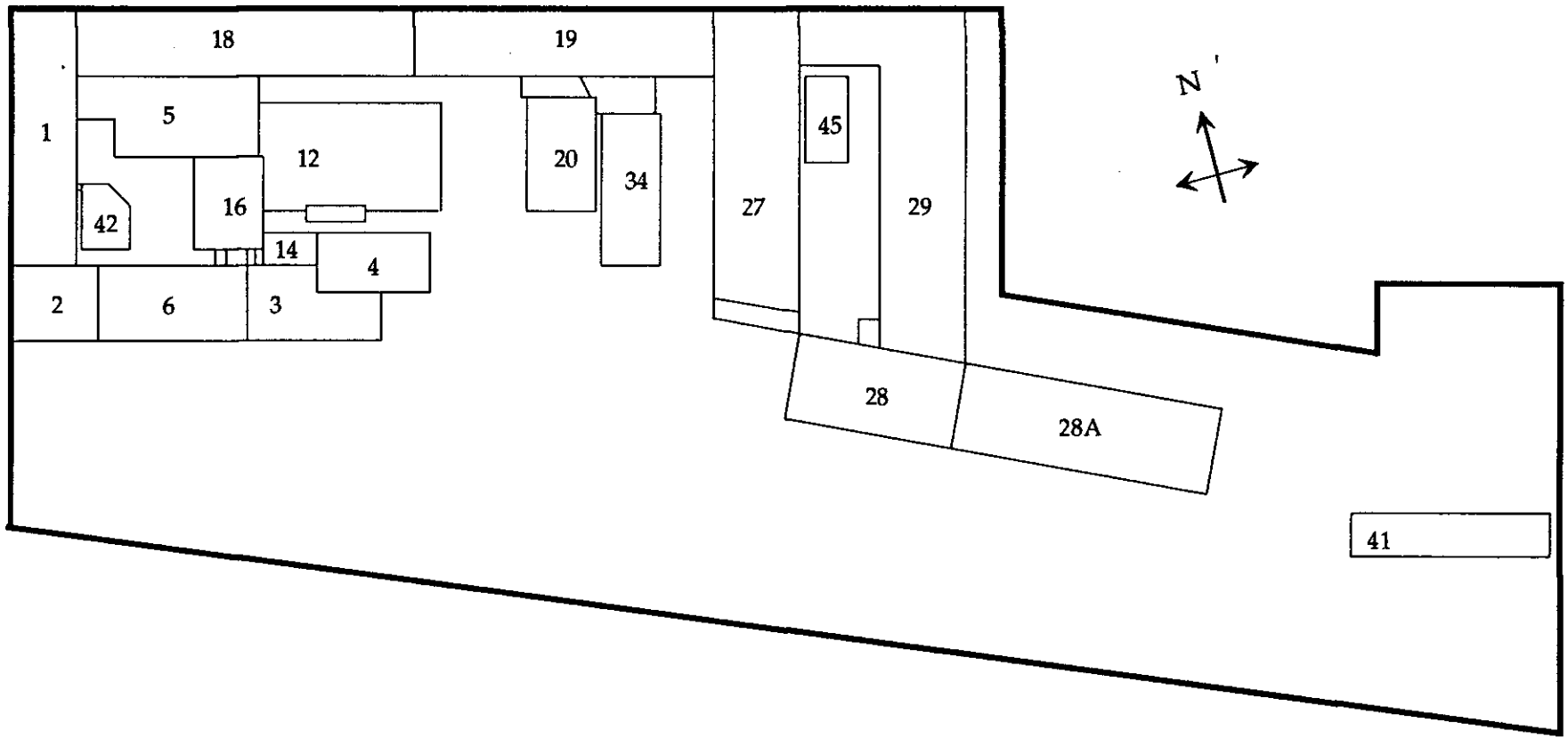

FAFNIR SITE PLAN - 1947

New Building: 45

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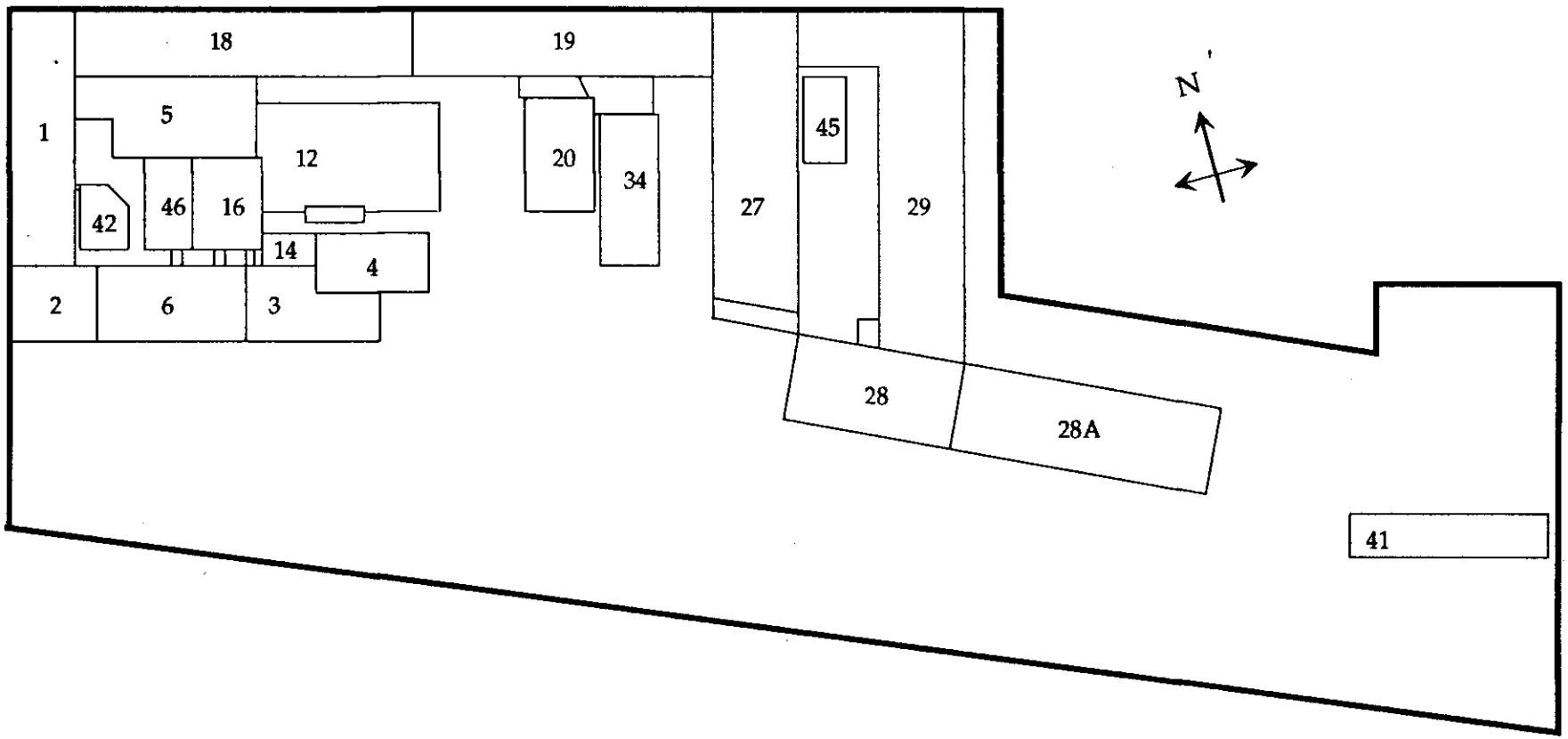
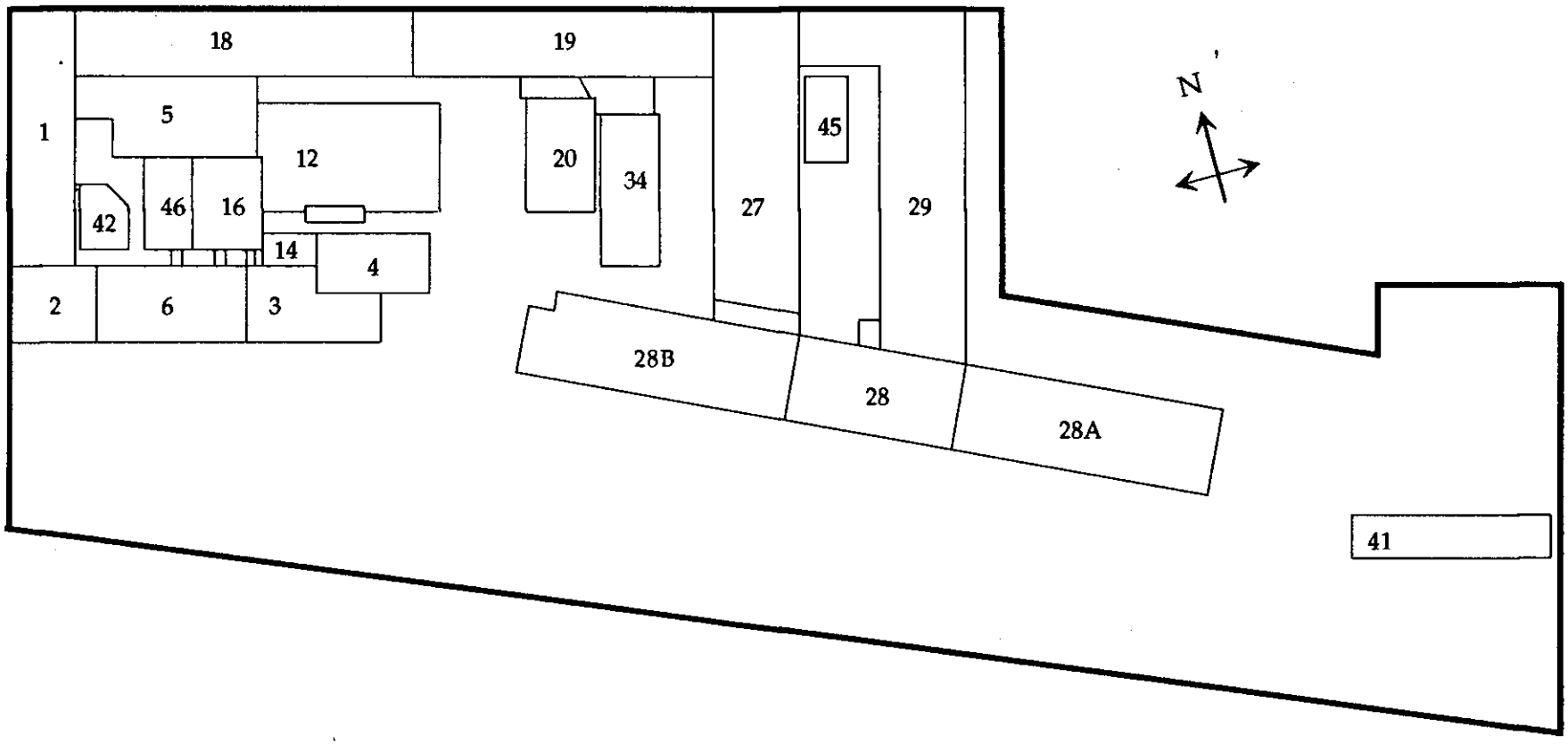


FAFNIR SITE PLAN - 1948

New Building: 46



FAFNIR SITE PLAN - 1951

New Building: 28B

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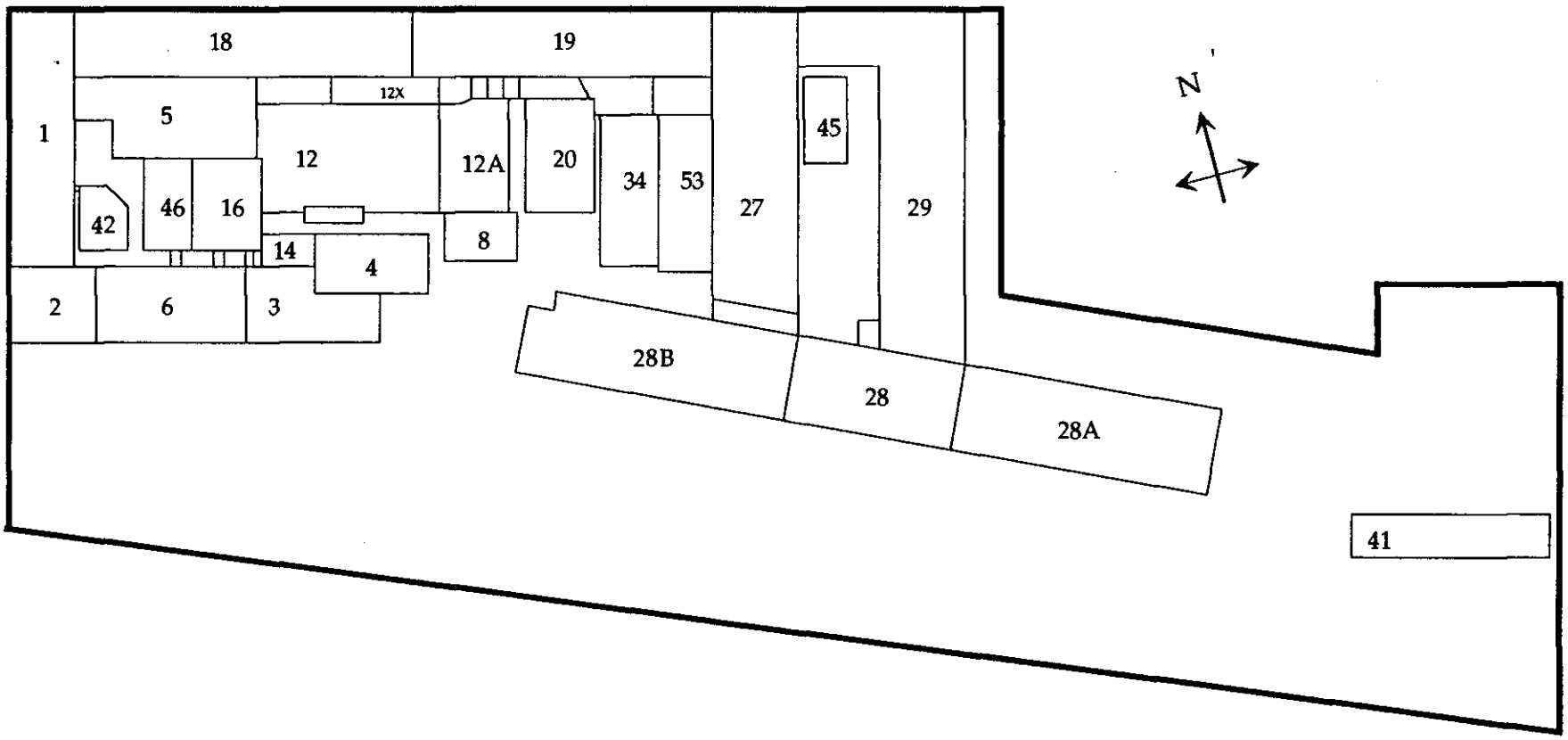

FAFNIR SITE PLAN - 1966

New Buildings: 12A, 12X, 53, 8

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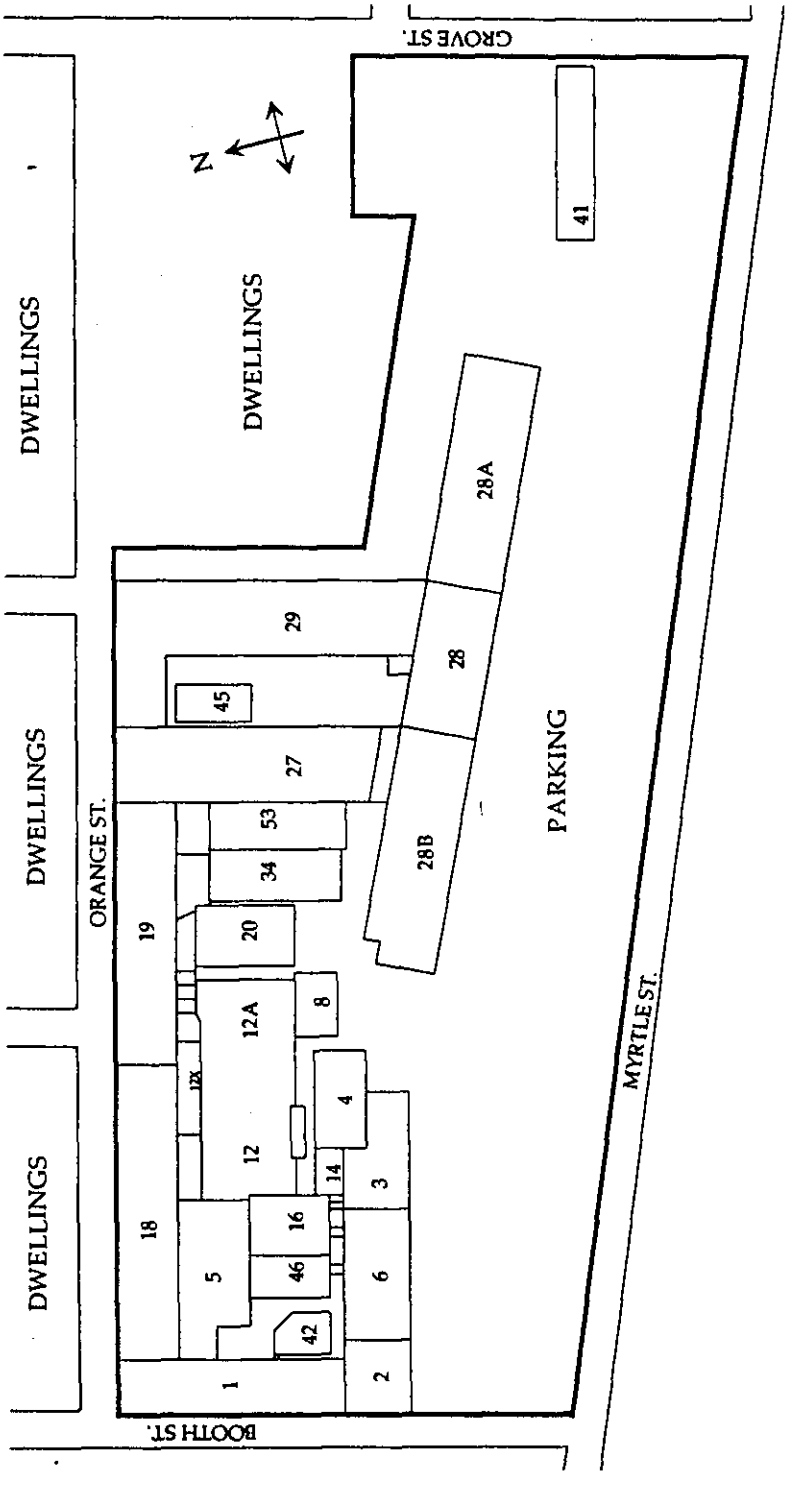
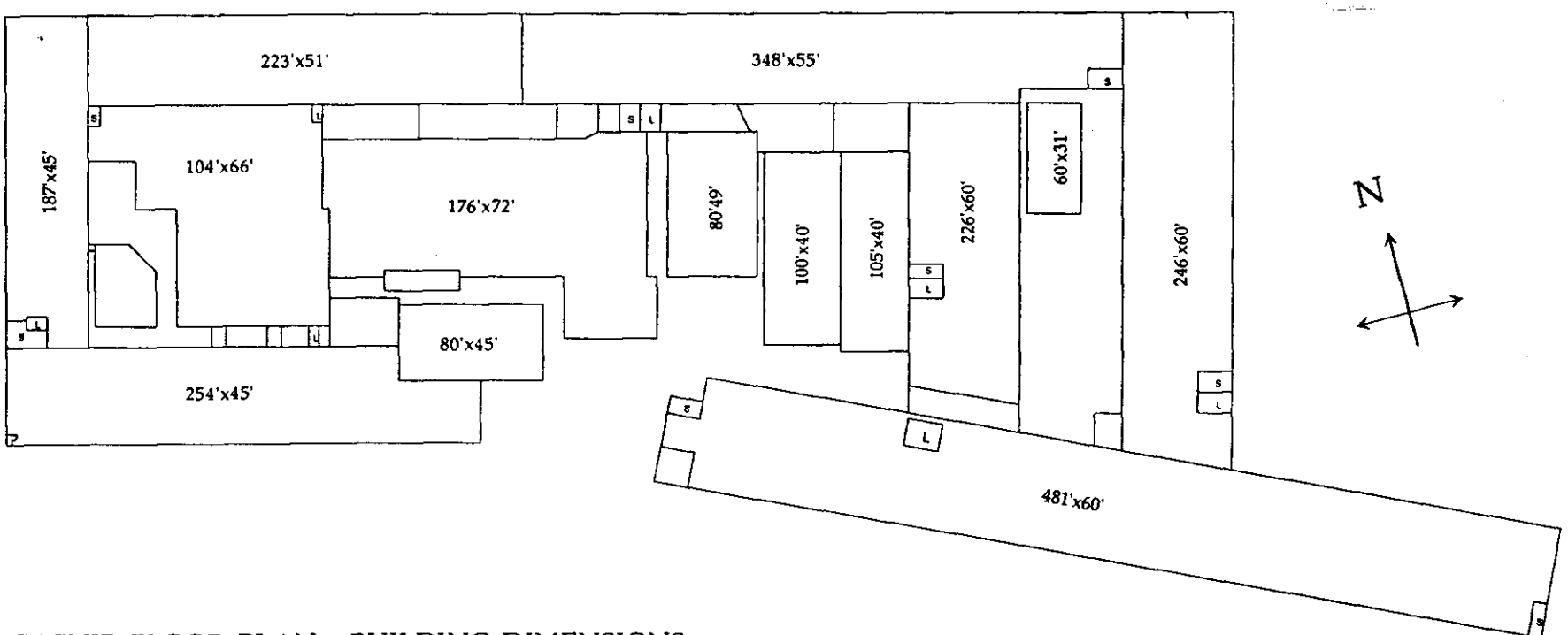


FAFNIR SITE PLAN - 1996



FAFNIR FLOOR PLAN - BUILDING DIMENSIONS

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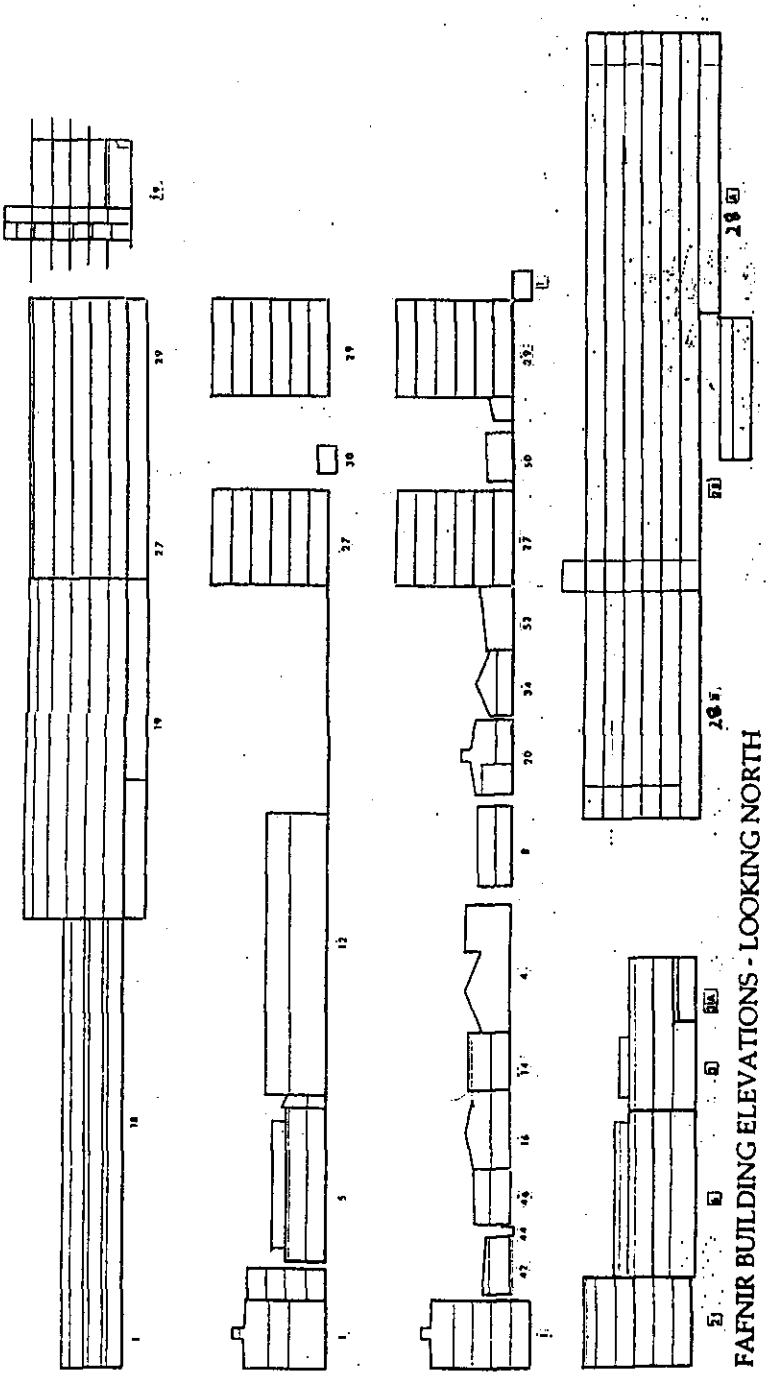

FAFNIR BUILDING ELEVATIONS - LOOKING NORTH